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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
|-----------------|-------------|----------------------|---------------------|
| 09/268,948      | 03/16/99    | TAKAHASHI            | mk                  |

RANDALL J KNUTH  
3510 A STELLHORN ROAD  
FOT WAYNE IN 46815

IM62/1107

| EXAMINER    |
|-------------|
| CANTELMO, G |

| ART UNIT | PAPER NUMBER |
|----------|--------------|
| 1753     | 9            |

DATE MAILED: 11/07/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.  
09/268,948

Applicant(s)  
Takahashi

Examiner  
Gregg Cantelmo

Group Art Unit  
1753



☒ Responsive to communication(s) filed on Aug 28, 2000

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claim

☒ Claim(s) 1, 2, and 10-13 is/are pending in the applicat

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1, 2, and 10-13 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☒ None of the CERTIFIED copies of the priority documents have been  
☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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## DETAILED ACTION

### *Response to Amendment*

1. In response to the amendment received on August 28, 2000:
  - a. The specification objections presented in the previous office action are withdrawn in light of the amendment;
  - b. The claim objection presented in the previous office action is withdrawn;<sup>710H</sup>
  - c. The 102 rejection drawn to Takahashi stands. However upon discovering the month of publication to be November of 1993, this reference constitutes prior art under 35 USC 102(a) and not 35 USC 102 (b) as previously presented;
  - d. The 103 rejection drawn to Kano stands;
  - e. The double patenting rejection stands.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

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3. Claims 1-2 and 10-13 are rejected under 35 U.S.C. 102(a) as being anticipated by Takahashi et al. "Synthesis of  $\text{Fe}_{16}\text{N}_2$  films by using a reactive plasma" (1993) hereafter referred to as Takahashi 1993, of record and for the reasons of record.

Therein Takahashi 1993 discloses forming Fe-N onto a MgO substrate films using a facing (otherwise understood as opposing) target type DC sputtering apparatus (page 3040, second column and page 3041 first column). The process is performed under identical plasma conditions  $T_e$  is within a range of about 0.2 eV and 0.6 eV and  $N_e$  is about  $10^9 \text{ cm}^{-3}$ . The result was an Fe-N sputtered film wherein only diffracted line of (002) from  $\alpha'$  is observed (page 3041, second column). Since the opposed DC sputtering is performed under the same plasma conditions the film formed will inherently have the same properties. The structure of the film will be an  $\alpha'$ - $\text{Fe}_{16}\text{N}_2$  single phase (page 3041, column 1 as applied to instant claims 1 and 10-11).

The method of forming the film is not germane to the issue of patentability of the film itself. Therefore the limitation of alternating DC sputtering has not been given patentable weight (as applied to instant claim 2).

The iron nitride film is formed on an iron underlayer on the substrate (page 3041, first column, paragraph beginning with "[p]rior to the fabrication", as applied to claims 12 and 13).

#### *Response to Arguments*

4. Applicant's arguments filed August 28, 2000 have been fully considered but they are not persuasive. In particular:

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Applicant argues that the rejection above does not constitute prior art since it is published by the same inventor of the application, the application being filed within one year of the publication.

A prima facie case is made out under 35 U.S.C. 102(a) if, within 1 year of the filing date, the invention, or an obvious variant thereof, is described in a "printed publication" whose authorship differs in any way from the inventive entity unless it is stated within the publication itself that the publication is describing the applicant's work. In re Katz, 687 F.2d 450, 215 USPQ 14 (CCPA 1982).

Applicant may be able to rebut this rejection by showing the reference's disclosure was derived from applicant's own work (See MPEP § 2131.01).

### *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-2 and 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by A.

Kano et al., "Metastable Fe Nitrides with High Bs Prepared by Reactive Sputtering", J. Appl.

Phys. 53(11), Nov. 1982, pp 8332-8334 (hereafter referred to as Kano).

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Kano discloses of a magnetic thin film manufacturing method comprising: introducing argon and nitrogen into a chamber holding a substrate (page 8332, under the subheading "Experimental Procedure" lines 1-7); applying DC power to an iron target in the atmosphere (page 8332, second column, lines 9-12). Furthermore the substrate temperature is less than 200 degrees Celsius (page 8332, second column, lines 5-8). Therefore, since the substrate temperature is below 200 degrees Celsius and the iron target is sputtered in an argon and nitrogen atmosphere via DC power, Kano will inherently generate the same nitrogen martensite  $\alpha'$  phase. The nitrogen gas flow percentage is within the claimed range of 1- to 25 % (Fig. 1). The presence of an  $\alpha$  Fe film is taught (page 8333, lines 45-47). Kano also teaches of heat treating the film (page 8333, lines 28-36; Fig. 4).

It is also clear that Kano teaches that, with respect to a  $\text{Fe}_{16}\text{N}_2$  film, it is inherent that the temperature be below 200 degrees Celsius to prevent the film from decomposing (page 8333, lines 41-47). Furthermore, since Kano discloses the importance of the  $\text{Fe}_{16}\text{N}_2$  film (page 8332, under subheading "Introduction", lines 13-15) and that temperatures above 200 are undesirable due to the adverse effects such a temperature range would have on a  $\text{Fe}_{16}\text{N}_2$  film, and that the instant application employs the same process conditions to obtain a desired crystalline phase, Kano will inherently generate the same crystalline phase.

Kano discloses of the electron voltage range of the instant claims (page 8332, second column, lines 11-12). By varying the electron voltage, the density of the electrons will vary in direct relation to the electron voltage variance. Having disclosed such a range, it is the

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examiner's position that the electron voltage range of Kano will generate a range of electron densities which will overlap or encompass the instantly claimed electron density range. Having such an overlap would obviously generate the same film as that claimed in the instant application. Therefore it is expected that since the  $\text{Fe}_{16}\text{N}_2$  is formed under the same conditions as the instant application, the resultant film will have the same crystal orientation.

The method of forming the film is not germane to the issue of patentability of the film itself. Therefore the limitation of alternating DC sputtering has not been given patentable weight (as applied to instant claim 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the process of Kano by selecting the desired electron density range since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

### ***Response to Arguments***

7. Applicant's arguments filed August 28, 2000 have been fully considered but they are not persuasive. In particular:

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., of a process temperature or electron density) are not recited in the rejected claim(s). Although the claims are

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interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

These parameters are drawn to the process conditions under which the instantly claimed film is formed. While the parameters between the prior art and instant disclosure may not be verbatim, applicant provides no clear evidence that the prior art of Kano does not generate the same film. In fact, it would appear that according to the amendment at page 3, lines 6-20, such evidence is not known to applicant. Therein applicant states that applicant has not discovered a way to determine the structure nor analyze it. If this is true then how can the examiner or applicant be certain that the prior art of record does not have the same structure when it appears that applicant cannot readily analyze it for structural comparisons?

If possible, applicant is invited to provide a side-by-side comparison of the prior art film and instantly claimed film with factual evidence that the prior art film is not the same as the claimed invention.

Furthermore, while applicant is entitled to express a structure by method, applicant is also requested to provide evidence that the prior art process clearly does not form a film having the same structure. Absent a side-by-side comparison, the examiner lacks sufficient evidence that the prior art of record does not have the same structure. And since applicant has not discovered a way to analyze the structure, such evidence does not seem readily apparent.



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***Claim Rejections - 35 USC § 103***

8. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kano as applied to claims 1-2 and 10-11 above, and further in view of Takahashi.

The difference not yet discussed is of disposing an underlayer of iron on the substrate and then depositing the iron nitride film atop the underlayer.

Both Kano and Takahashi are drawn to depositing iron nitride films having higher Bs. While Kano does not appear to explicitly disclose of disposing an iron underlayer. Takahashi does so to impart a desired (001) grain orientation.

The motivation then for disposing an iron underlayer is to impart a desired grain orientation for the deposited films.

Therefore it would have been obvious to the skilled artisan at the time the claimed invention was made to modify the teachings of Kano by depositing an iron underlayer since it would have imparted a desired grain orientation for the deposited films.

***Double Patenting***

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground

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provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 1-2 and 10-11 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 3-20 of copending Application No. 08/765,836. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method of copending application No. 08/765,836 will obviously if not inherently generate the same film claimed in the instant application. This is evident since the conditions recited in the copending application are identical to those in the instant application required to generate the claimed film.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

#### ***Response to Arguments***

11. Applicant's arguments filed August 28, 2000 have been fully considered but they are not persuasive. In particular:

Applicant only addresses this double patenting rejection and has not persuaded the examiner to withdraw the rejection.

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*Conclusion*

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (703) 305-0635. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on (703) 308-3322. FAX communications should be sent to the appropriate FAX number: (703) 305-3599 for After Final Responses only; (703) 305-7718 for all other responses. FAXES received after 4 p.m. will not be processed until the following business day. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



NAM NGUYEN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700

gc

November 2, 2000